

REMARKS

Favorable reconsideration is respectfully requested.

The claims are 5-8. Claims 1-4 are cancelled. New claims 5-8 are added.

New claims 5-8 correspond to original claims 1-4.

No new matter is added.

Claim Rejections – 35 U.S.C. § 112

Claims 1-4 are rejected under 35 U.S.C. § 112, second paragraph as being indefinite. The claims are currently amended to address these rejections.

Claim Rejections – 35 U.S.C. § 103

Claims 1-4 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Shibata (JP 60204857) (hereinafter referred to as JP'857).

Claims 1-4 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Parson et al. (U.S. 6,440,359) (hereinafter referred to as U.S.'359) in view Ohyama et al. (U.S. 6,355,090) (hereinafter referred to as U.S.'090).

Applicants respectfully traverse each of these rejections.

1. The Present Invention

The present invention relates to a specific aluminium alloy with the selection of the specific alloying elements recited in claim 5. More precisely, it is found with the present invention, that the addition of Mn as an alloying element within specified limits, i.e., 0.02 - 0.08 wt%, in combination with low additions of Mg and Si, has a positive effect on the extrudability of a AlMgSi alloy. In addition to promoting the transformation of the AlFeSi intermetallic

phases, AlMnFeSi dispersoid particles are formed during homogenization. These particles act as nucleation sites for Mg₂Si particles during cooling after homogenization.

In a high quality billet, the Mg₂Si particles formed during cooling after homogenization easily dissolve during the preheating and the extrusion operation before the material reaches the die opening. With a larger number of dispersoid particles, a higher number of Mg₂Si particles are formed, resulting in a reduced size of each particle. Since the rate of dissolution of a Mg₂Si particle is proportional to its size, a high quality billet of the present invention contains a certain amount of AlMnFeSi dispersoid particles, which promote the formation of a relatively large number of small Mg₂Si particles that dissolve easily during the preheating and extrusion operation.

2. JP'857

JP'857 relates to a completely different aluminium alloy as it contains at least 1%, but up to 30% carbide or other particles and thus is an aluminium composite. In addition, the alloy of this reference contains the additional alloying element, Li, and ranges of Si and Mg which are far beyond what is recited in claim 5 of the present application.

Accordingly, JP'857 does not disclose or suggest all of the features of the present invention and the rejection based on this reference should be withdrawn.

3. U.S.'359 in view of U.S.'090

U.S.'359 relates to an aluminium alloy, where the addition of Mn (0.015) is below the important limits of the present invention, i.e., 0.02 – 0.08 wt%, as mentioned above, to obtain the effect of promoting the transformation of the AlFeSi intermetallic phases and the formation of AlMnFeSi dispersoid particles during homogenization. The alloy according to U.S.'359 also lacks the presently claimed Cr and Zn as alloying elements.

U.S.'090 describes an aluminium alloy for wrought material where the alloy contains wide ranges of Mg and Si (both up to 5%). The alloy further contains a wide range of Mn between 0.01-1.2, and there is no disclosure or suggestion in this reference of the importance of controlling the Mn level within a narrow range, i.e., between 0.02 – 0.08 wt% to obtain the advantageous AlFeSi intermetallic phases and AlMnFeSi dispersoid particles as described above.

By combining U.S.'359 and U.S.'090, as suggested by the Examiner, one of ordinary skill in the art would therefore not arrive at the present invention. Neither of the two cited references disclose or suggest selecting the presently claimed narrow Mn content of 0.02-0.08 wt%, in combination with a low content of Si and Mg, respectively, to obtain the above described benefits of the present invention, as disclosed in the present specification, at page 6, lines 25-32.

Accordingly, U.S.'359 in view of U.S.'090 does not suggest all of the features of the present invention, and the rejection based on these references should be withdrawn.

No further issues remaining, allowance of this application is respectfully requested.

If the Examiner has any comments or proposals for expediting prosecution, please contact the undersigned at the telephone number below.

Respectfully submitted,

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